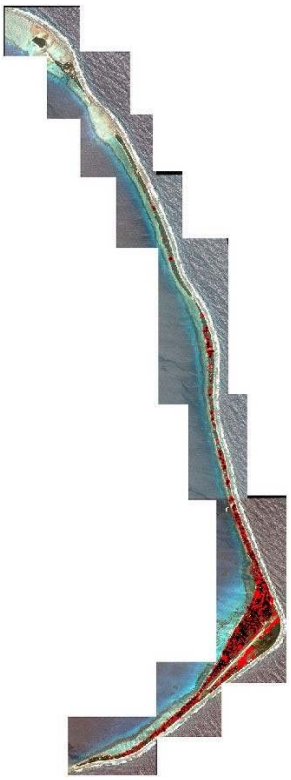
PACIFIC HYCOS MISSION TO TUVALU

27 June – 11 July 2008



The QuickBird 60cm resolution pan sharpened image backdrop with tile showing Funafuti and surveyed roofs in red. Data captured by onscreen digitising from the image backdrop

Edwin Liava'a

HYCOS Project – Database / GIS Specialist

SOPAC Trip Report 446

November 2009

DISCLAIMER

This document has been produced with the financial assistance of the European Union. The views expressed herein can in no way be taken to reflect the official opinion of the European Union.

ACRONYMS

DB	Database
EU	European Union
GIS	Geographic Information System
GPS	Global Positioning System
ICT	Information and Communication Technologies
MIS	Management Information System
MS	Microsoft
ODBC	Open Database Connectivity
PDF	Portable Document Format
RDBMS	Relational Database Management System
SOPAC	Pacific Islands Applied Geoscience Commission
MBX	MapBasic Application (Executable File)
MLS	Ministry of Lands and Survey
MNRE	Ministry of Natural Resources and Environment
PWD	Public Works Department
TDE	Tuvalu Department of Energy
TEC	Tuvalu Electric Corporation
TTC	Tuvalu Telecommunication Commission

CONTENTS

EXECUTIVE SUMMARY 5

INTRODUCTION.....5

OBJECTIVE….....5

LIST OF CONTACTS.....6

GENERAL….. 6

CONCLUSION(S) 9

RECOMMENDATION(S) 9

LIST OF ANNEXES

1 Delivery Note – Am Pelosa Tehulu/ PWD 10

2 SOPAC letter – Am Pelosa Tehulu/ PWD 11

3 Training Schedule.....12

4 List of Trainees.....14

5 Photographs 15

6 TV_CatchRain MIS-GIS User's Guide Manual.....17

EXECUTIVE SUMMARY

It was observed from the HYCOS site mission in March that the use of GIS to assist in the distribution of rainwater tanks was well received and further progress on developing this system was recommended.

As a result a comprehensive data integrity check of existing datasets was conducted whereby inconsistencies were discovered and corrected with records that required double checking especially tank size measurements needed double checking onsite, during the site visit. Furthermore, changes to the design of the existing framework of the database were implemented, especially the application, relationships and the user interface.

The most crucial change in the design was moving the existing data to a back-end database that can be implemented in a client server environment of a corporate local area network (LAN). The back-end database sits on a server while clients have the front-end user interface database consisting of forms, queries, reports, macros and code modules.

The benefits of splitting a database include:

- All users across the network share one common set of data.
- All users can update data at the same time.
- When the administrator needs to update the application (forms, reports etc.), they will not need to worry about interrupting processing of data or corrupting the data.

There was also a need to provide some training to understand the benefits of a GIS and to demonstrate how to develop and maintain such a system. Above all was to understand GIS as an asset management tool and as an analysis tool of current data for forecasting trends that will assist designing existing and future infrastructure development.

The training lasted for 10 days from the June 30 to July 11 Monday to Friday, whereby 13 participants were involved from the Ministry of Lands and Survey, Department of Energy, Public Works Department, Tuvalu Electricity Corporation, Tuvalu Telecommunications Commission and Funafuti Kaupule.

The site visit also provided the opportunity to deliver level and quality sampling equipment to the Public Works Department of Tuvalu as part of the HYCOS initiative for capacity building and development.

INTRODUCTION

The mission was a follow-up to the rainwater harvesting survey and Pacific HYCOS mission in March 08. Focus was to assist the delivery of tanks through implementing the use of Geographical Information System (GIS) in the assistance of planned water projects on Tuvalu under EDF9 B-Envelope and the ongoing water quality assessment associated with Pacific HYCOS.

OBJECTIVE

- To refine and correct existing data within the GIS catch rain database.
- To conduct training on the analysis, designing, development, implementation and maintenance of a GIS system.
- To split the MIS/GIS database into a server/client environment.
- To deploy level and quality sampling equipment within the Public Works Department (PWD) of Tuvalu.

LIST OF CONTACTS

Name	Designation	Ministry / Department
Mrs Loia Tausi	Lands Officer	Ministry of Lands and Survey (MLS)
Mr Uale Taleni	Secretary of Lands and Survey – SOPAC National Rep	Ministry of Natural Resources and Environment (MNRE)
Mr Am Pelosa M Tehulu	Acting Director of Works – PUI	PWD
Mr Faatasi Malologa	Director Lands and Survey	MLS
Mrs Noia Simona	IT Manager	Tuvalu Telecommunication Commission (TTC)
Mr Molipi Tausi	Energy Planner	Tuvalu Department of Energy (TDE)
Mr Polu Tanei	Electrical Supervisor	Tuvalu Electric Corporation (TEC)
Mr Greg Wolff	Water and Sanitation	PWD

GENERAL

Activity Name – Title / Task Profile Number	*ACTION*
27/06/08 **Mrs Loia Tausi** **Greg Wolff** **Am Pelosa M Tehulu, Acting Director of Public Works** ampextehulu@yahoo.com o Discussed GIS training needs and schedule. o Outlined advantages of using GIS in developing up criteria and database for managing project and water resources in general. o Provided PWD with Level and Quality Sampling equipment.	Am Pelosa M Tehulu to sign delivery note (refer Annex 1 Delivery Note).
30/06/08 **Training – Day 1** o Sending out invitations. o Introduction and overview: • Microsoft Access. • MapInfo. • MapBasic. • Global Positioning System (GPS). • How they all work together as the framework of a GIS.	

01/07/08 **Training – Day 2** o Microsoft Access: • Analysing a problem, designing and developing a solution. • Tables (entities), Records (rows), Attributes (columns). • Access menu, relationships and data types. • Designing data entry forms. • Using forms to populating tables. • Automating record operations. • Data vs. Information. • Data integrity checks.	MS-Access training material to participants in softcopy.
02/07/08 **Training – Day 3** o Microsoft Access: • Designing ad hoc queries. • Designing make table queries. • Designing reports. • Designing Macros. • Access modules coding. • Putting it all together. • How to use help and to be self-taught.	
03/07/08 **Training – Day 4** o MapInfo • Cartographic Concepts • Datum and Projections • MapInfo menu, preferences and directories • Designing tables • Linking Access and MapInfo • Making a table mappable • Layer control • Geocoding	MapInfo training material to participants in softcopy.
04/07/08 **Training – Day 5** o Trimble GeoXM GPS, Terra Sync, Active Sync and Pathfinder: • Data Dictionary. • Data Logger. • Field Survey. • Data download and transfer. • Export from Pathfinder Office. • Import to MapInfo.	
07/07/08 **Training – Day 6** o MapBasic: • Introduction to programming • Header files	MapBasic training material to participants in softcopy.

• MapBasic Source File .MB. • The main function. • Variables. • Selection Structure. • Repetition Structure. • First MapBasic Program .	
08/07/08 **Training – Day 7** o MapBasic: • Modularity. • MapBasic Project File .MBP. • MapBasic Object File .MBO. • MapBasic Application .MBX. • Function Calls. • First MapBasic Project.	
09/07/08 **Training – Day 8** o MapBasic and MapInfo: • Creating Menus in MapInfo. • Using the MapBasic Window in MapInfo. • Opening and registering tables from Access. • SQL and Select queries. • Using SQL queries to link tables. • Creating Thematic maps.	
10/07/08 **Training – Day 9** o Revision: • Microsoft Access. • MapInfo. • MapBasic.	
11/07/08 **Training – Day 10** o The TV_CatchRain.MDB database and GIS: • Microsoft Access database Splitting. • Data Input Forms. • Queries. • Reports. • Link to MapInfo. • Ground truthing of peculiarity in Residential tanks data.	Edwin to follow up on feedback and prepare Users Guide Manual for TV_CatchRain.MDB database and GIS.

CONCLUSION(S)

The Training conducted on GIS was well received at a competence level whereby trainees understand the benefits of a GIS; understand how to develop and to maintain such a system. Most importantly, they know how to be self-taught; how to use the help facilities; where to find help; and to share common solutions to common problems.

Coherently, since the government officers recognise the benefits a GIS and the applications that will benefit Tuvalu, the Water Monitoring Committee during their meeting on the 22 July, 2008 proposed to incorporate the water monitoring programme in the TV_CatchRain MIS/GIS.

RECOMMENDATION(S)

It is a great idea to incorporate the water monitoring programme in the TV_CatchRain MIS/GIS. But the author would propose that Public Health Department for the time being use an Excel Spreadsheet for inputting the monitoring data and report on weekly basis to PWD, a copy of the Spreadsheet to be imported into the TV_CatchRain MIS/GIS.

There is a Water Quality Database (WQM) currently under development and will be deployed soon, it would be wise not to duplicate work but for Public Health Department to start populating the excel spreadsheet for now until the WQM Database is fully functional. The existing data will then be moved to the new WQM Database, which can be link to the TV_CatchRain MIS/GIS.

Although, the author has confidence that the trainees could maintain the current system, such a transition between two separate systems was not covered during the training. Therefore, I would recommend a 3-day site visit to assist with the setup of the excel spreadsheet for transition to the new WQM database and the linking to the GIS.

ANNEX 1 Delivery Note – Am Pelosa Tehulu / PWD

SOPAC

Secretariat of the Pacific Islands Applied Geoscience Commission

Tel: +679 338 1377
Fax: +679 337 0040 / 338 4461
Web: www.sopac.org
E-mail: director@sopac.org

Postal Address: SOPAC Secretariat
Private Mail Bag, GPO
Suva, Fiji Islands
Street Address: Mead Road, Suva, Fiji Islands

Delivery Note

Delivered to AMPELOSA TEHULU
Public Works Department
Ministry of Works Communications and Transport
Funafuti
Tuvalu

Date 27 June 2008

Sign .....

Qty	Description	S/N
1	Garmin GPSMap76	80619861
1	Carry case	N/A
1	Olympus µ850SW digital camera	F02507187
2	PVC bailers	N/A
6	Line level	N/A
6	8m steel measuring tape	N/A
3	30m measuring tape	N/A
3	30m measuring tape with plopper	N/A
1	100m measuring tape	N/A
3	1L bottle of 2.76 µS/cm EC standard solution	N/A
1	Maxtor Mini 250GB portable hard drive	2HAPV9TP
1	Kingston 2GB USB flash drive	F506GX1-2950820D

Delivered By EDWIN LIAVA'A

Date 27 June 2008

Signature .....

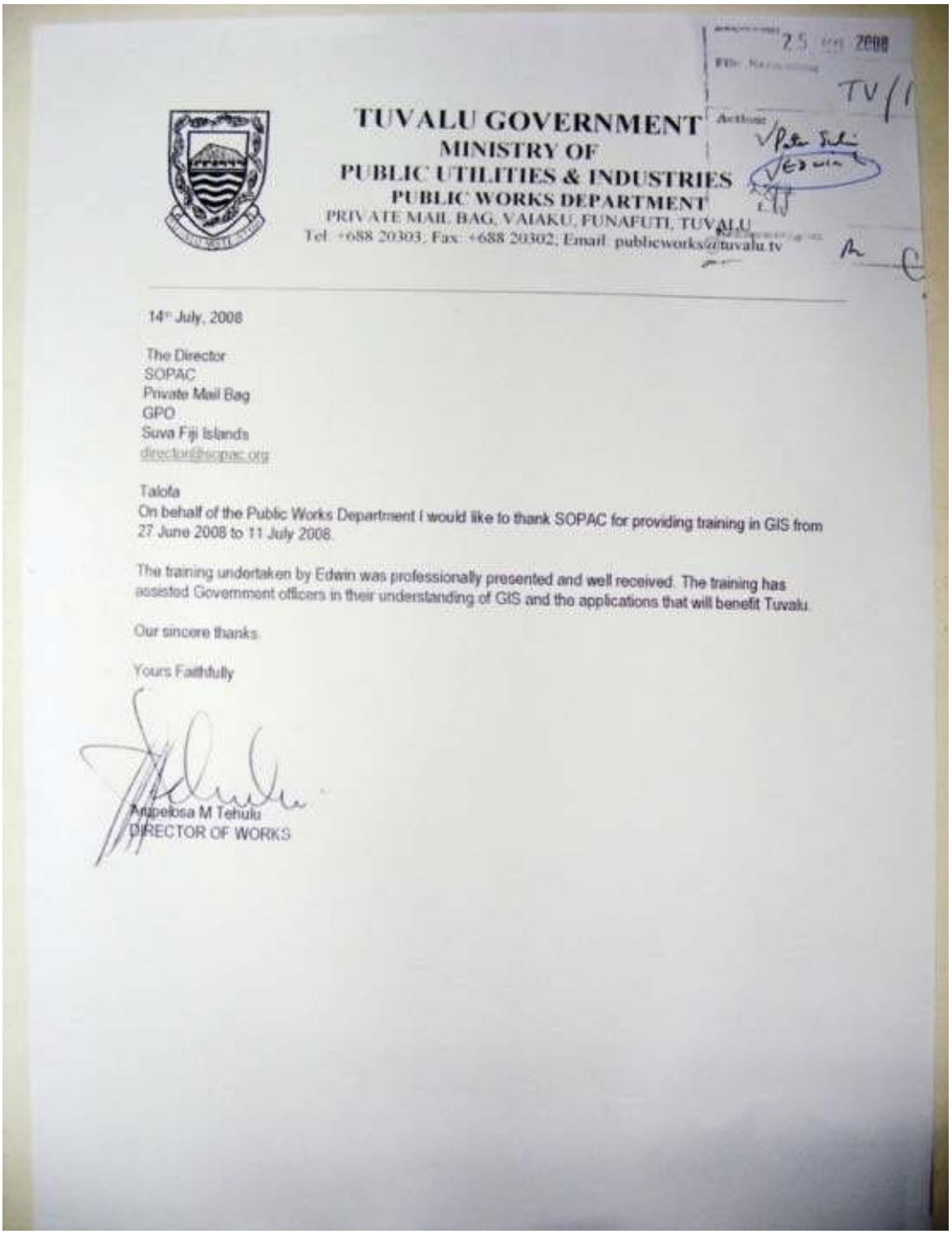
OFFICIAL USE

Database Update ..... Date .....

Asset Write Off .....

F 31

ANNEX 2 SOPAC Letter – Am Pelosa Tehulu / PWD



TUVALU GOVERNMENT
MINISTRY OF
PUBLIC UTILITIES & INDUSTRIES
PUBLIC WORKS DEPARTMENT
PRIVATE MAIL BAG, VAIAKU, FUNAFUTI, TUVALU
Tel: +688 20303, Fax: +688 20302, Email: publicworks@tuvalu.tv

14th July, 2008

The Director
SOPAC
Private Mail Bag
GPO
Suva Fiji Islands
director@sopac.org

Talofa
On behalf of the Public Works Department I would like to thank SOPAC for providing training in GIS from 27 June 2008 to 11 July 2008.

The training undertaken by Edwin was professionally presented and well received. The training has assisted Government officers in their understanding of GIS and the applications that will benefit Tuvalu.

Our sincere thanks.

Yours Faithfully

Ampelosa M Tehulu
DIRECTOR OF WORKS

ANNEX 3 Training Schedule – Week 1

WEEK 1 DAY 1: Mon 30 June 2008

- GIS Introduction and overview **02:00pm – 04:00pm**
  - Microsoft Access
  - MapInfo
  - MapBasic
  - Global Positioning System (GPS)
  - How they all work together as the framework of a GIS

WEEK 1 DAY 2: Tue 01 July 2008

- Microsoft Access
  - Analysing a problem, designing and developing a solution **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - Tables (entities), Records (rows), Attributes (columns) **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - Access menu, Relationships and data types **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Designing data entry forms **02:45pm – 04:00pm**

WEEK 1 DAY 3: Wed 02 July 2008

- Microsoft Access
  - Designing ad hoc queries **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - Designing make table queries **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - Designing reports **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Designing Macros and Modules **02:45pm – 04:00pm**

WEEK 1 DAY 4: Thu 02 July 2008

- MapInfo
  - Cartographic Concepts **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - MapInfo menu, preferences and directories **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - Tables, Linking Access and MapInfo **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Layer Control, Snap and Geocoding **02:45pm – 04:00pm**

WEEK 1 DAY 5: Fri 03 July 2008

- GPS (Global Positioning System)
  - Pathfinder Office and Data Dictionary **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - Microsoft ActiveSync and Data download and transfer **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - Trimble TerraSync and GeoXM data logger **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Export from Pathfinder Office and Import to MapInfo **02:45pm – 04:00pm**

Training Schedule – Week 2

WEEK 2 DAY 1: Mon 07 July 2008

- MapBasic
  - Introduction to programming **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - Header files and MapBasic Source files .MB **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - Function Main () and Variables **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Selection and Repetition Structures **02:45pm – 04:00pm**

WEEK 2 DAY 2: Tue 08 July 2008

- MapBasic
  - Modularity and Function Calls **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - MapBasic Project File .MBP **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - MapBasic Application .MBX **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - MapBasic Object File .MBO **02:45pm – 04:00pm**

WEEK 2 DAY 3: Wed 09 July 2008

- MapBasic and MapInfo
  - Creating Menus and the MapBasic Window in MapInfo **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - Opening and Registering tables from Access **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - SQL and Select queries to link tables **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - Using MapBasic to create Thematic maps **02:45pm – 04:00pm**

WEEK 1 DAY 4: Thu 10 July 2008

- Revision – Putting it all together
  - Ms-Access **09:00am – 10:15am**
  - Morning Tea Break **10:15am – 10:45am**
  - MapInfo **10:45am – 12:00pm**
  - Lunch Break **12:00pm – 01:00pm**
  - MapBasic **01:00pm – 02:15pm**
  - Afternoon Tea Break **02:15pm – 02:45pm**
  - MapBasic **02:45pm – 04:00pm**

WEEK 1 DAY 5: Fri 03 July 2008

- The TV_CatchRain.MDB database and GIS
  - Microsoft Access database Splitting **09:00am – 10:15am**
  - Forms, Queries, Reports and Links to MapInfo **10:15am – 10:45am**
  - Ground truthing of peculiarity in Residential tanks data **10:45am – 12:00pm**
  - Lunch Break and Check-in **12:00pm – 01:00pm**

ANNEX 4 List of Trainees

Name	Designation	Ministry / Department
Mrs Loia Tausi	Lands Officer	MLS
Mrs Noia Simona	IT Manager	TTC
Mrs Meelina Ailesi	Technician Network	TTC
Mrs Peitata Sente	Community Worker	Funafuti Kaupule (FK)
Mr Collin Namoliki	Draughtsman	MLS
Mr Vakafa Lupe	Draughtsman	MLS
Mr Ane Talia	Survey Assistance	MLS
Mr Greg Wolff	Water and Sanitation	PWD
Mr Kiritome Irata	Quality Surveyor	PWD
Mr ‘Elekana Tofinga	Housing Officer	PWD
Mr Pisi Afaaso	Water & Sanitation Supervisor	PWD
Mr Molipi Tausi	Energy Planner	TDE
Mr Polu Tanei	Electrical Supervisor	TEC

ANNEX 5 Photographs

Fig 1. Training Room – Front.

Fig 2 Training Room – Left

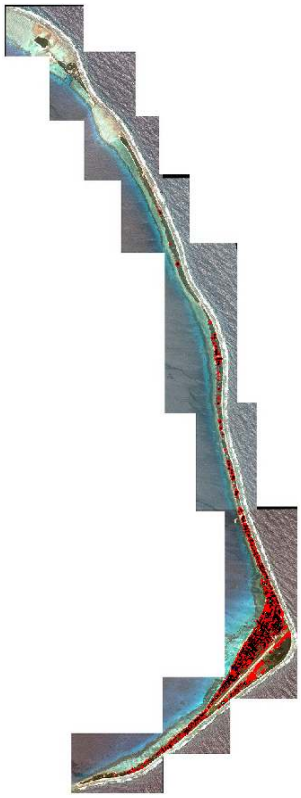
Fig 3. Training Room – Middle.

Fig 4. Training Room – Right.

ANNEX 6 TV_CatchRain MIS-GIS User's Guide Manual

Establishment of a Geographical Information System for Rain Water Catchment in Tuvalu

TV_CatchRain MIS/GIS User Manual



The QuickBird 60cm resolution pan sharpened image backdrop with tile showing Funafuti and surveyed roofs in red.

Data captured by onscreen digitising from the image backdrop

Document Version 1.02 - Draft

30 **July 2008**

HYCOS Project – Database / GIS Specialist

Edwin Liava'a

Acronyms

DB	Database
EU	European Union
GIS	Geographic Information System
GPS	Global Positioning System
ICT	Information and Communication Technologies
MBX	MapBasic Application (Executable File)
MIS	Management Information System
MS	Microsoft
ODBC	Open Database Connectivity
PDF	Portable Document Format
RDBMS	Relational Database Management System
SOPAC	South Pacific Applied Geoscience Commission

Contents

Introduction 1

Technical Requirements and Specifications 1

System requirements: 1

The Design and the Application 1

The Login Form 2

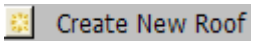
The Roof Form 2

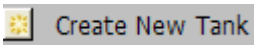
Roof Form - Quick Overview 3

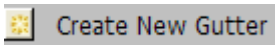
The Roof Details 3

The Tanks Information 4

The Tasks Panel 4

1. Create New Roof  4

2. Create New Tank  7

3. Create New Gutter  7

4. View Reports 8

The Setup Panel 8

To Edit any Existing Record 9

MapBasic Application and MapInfo 10

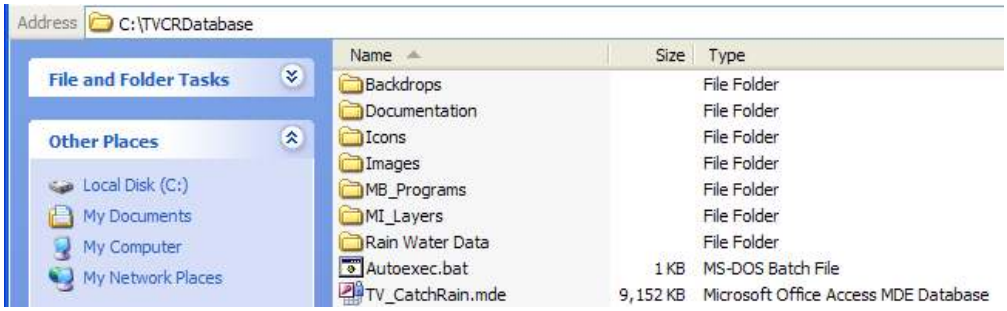
Introduction

This document is the follow up of the MIS/GIS training during the HYCOS site visit to Tuvalu from the 27th June to the 11th July 2008.

This document consists of screen shots with text that describes how to use the Ms-Access MIS and the link to MapInfo for presentations of maps.

Technical Requirements and Specifications

The TV_CatchRain MIS/GIS has been built entirely in Microsoft Access and MapBasic. It is distributed as an Access application, MapBasic modules and application, MapInfo layers, a batch file and data files. Where users have MS Access 2002 or 2003 installed, then they can run TV_CatchRain DB by just copying the application and data files onto their system onto C:\TVCRDatabase:



System requirements:

Any reasonably modern PC running MS Windows 2000, XP or later should be able to run the TV_CatchRain DB. In detail, the following gives an indication of reasonable specification requirements:

- Pentium PC, preferably 800 MHz or faster
- Windows 98 (2nd Edition), NT, 2000 or XP. It will not run on Windows 95. If using NT, you must be have Service Pack 6 installed.
- 256 MB RAM is the minimum recommended; more is beneficial with Windows 2000 or XP.
- A CD-ROM drive is needed for installation. In a network situation, the CD-ROM contents can be copied to the network and installed to individual PCs from there.
- If using your own Microsoft Access 2002, it needs to be at least on Office XP Service Pack 1.
- At least MapInfo 9.0 and MapBasic 9.0. If using previous versions like MapInfo 7.0, all MapBasic Modules must be compiled in the corresponding version of MapBasic 7.0 for the application to run in your previous version of MapInfo.

The Design and the Application

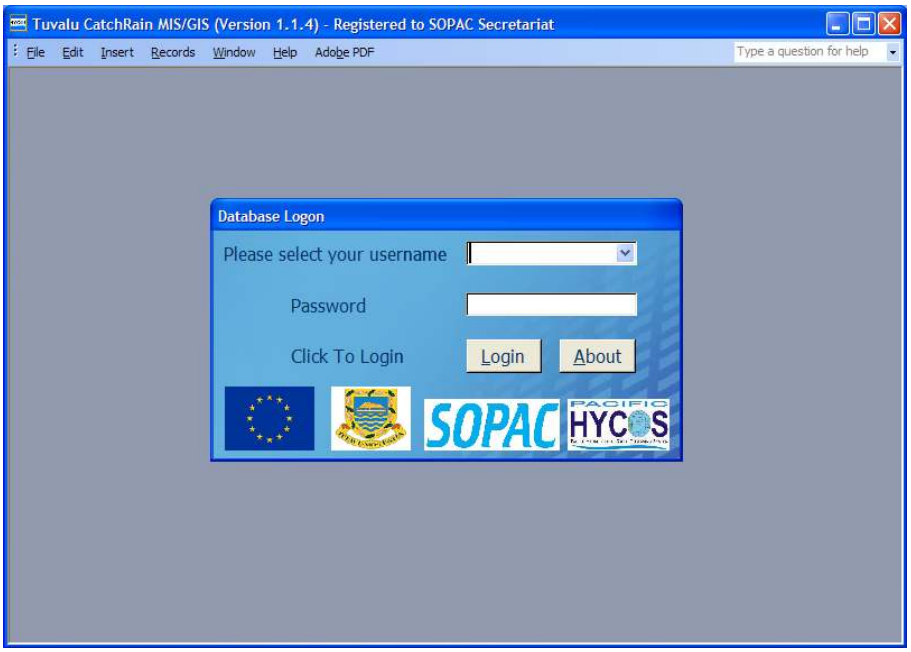
The design involves moving the existing data to a back-end database that can implemented in a client server environment in a corporate local area network (LAN). The back-end database sits on a server while clients have the front-end user interface database consisting of forms, queries, reports, macros and code modules that opens MapBasic applications for MapInfo.

The benefits of splitting a database include:

- All users across the network share one common set of data
- All users can update data at the same time
- When the administrator needs to update the application (forms, reports etc.), they will not need to worry about interrupting processing of data or corrupting the data.

The Login Form

The user needs to have a username and password for authentication. Username and passwords can only be issued by the Database Administrator.



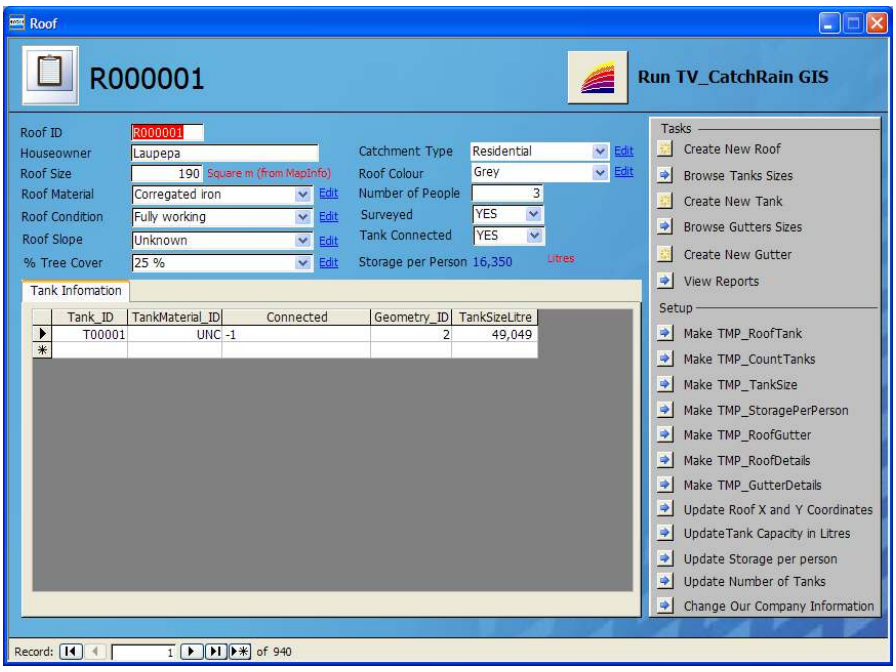
Step 1: Select your username from the drop-down combo box

Step 2: Type your password in the password text box

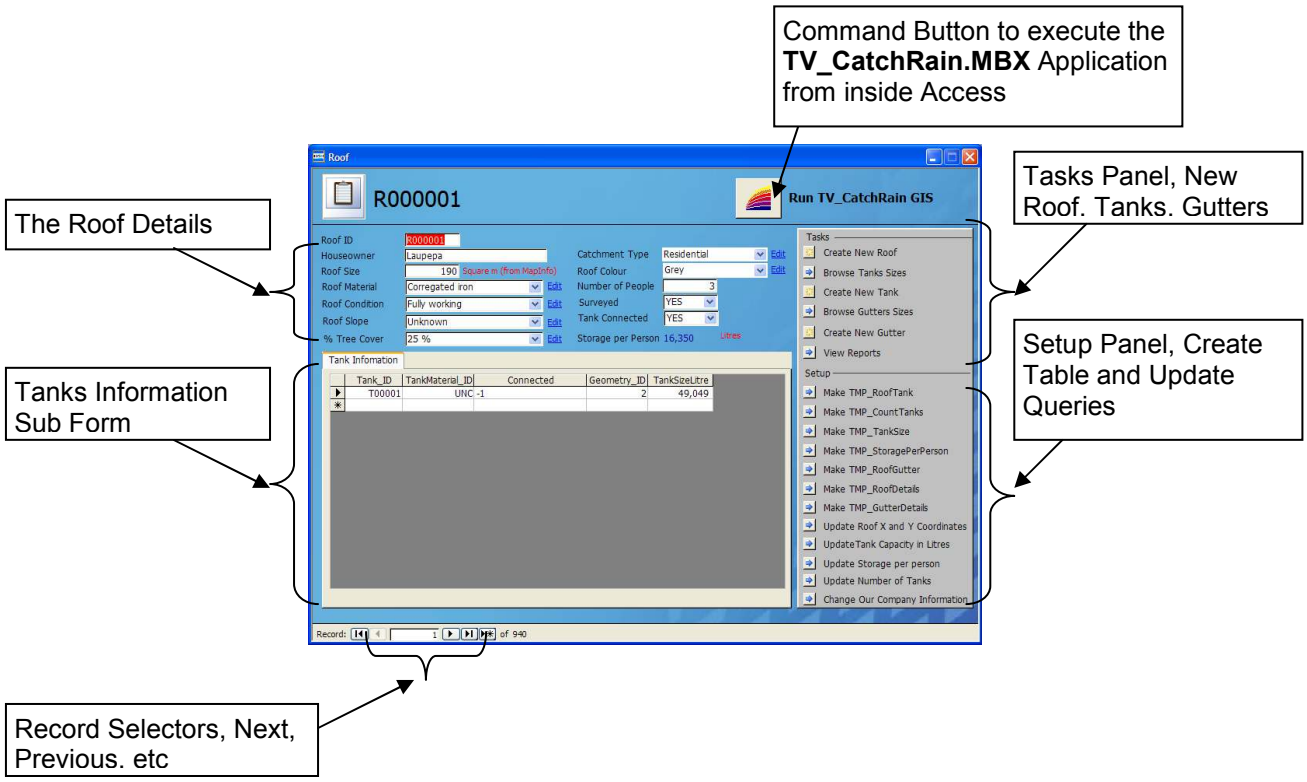
Step 3: Click Login command button to Logon

The Roof Form

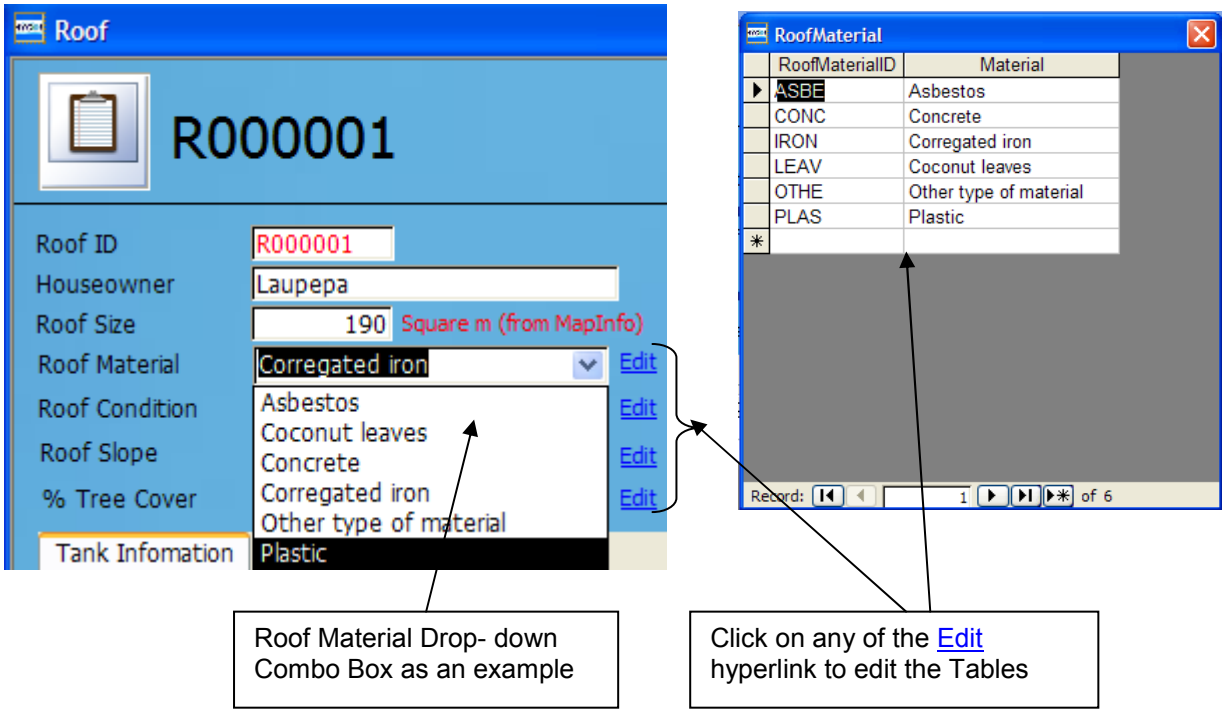
After login, the Roof form will appear as the main switchboard that will enable the user to access all the other functionalities of the TV_CatchRain database.



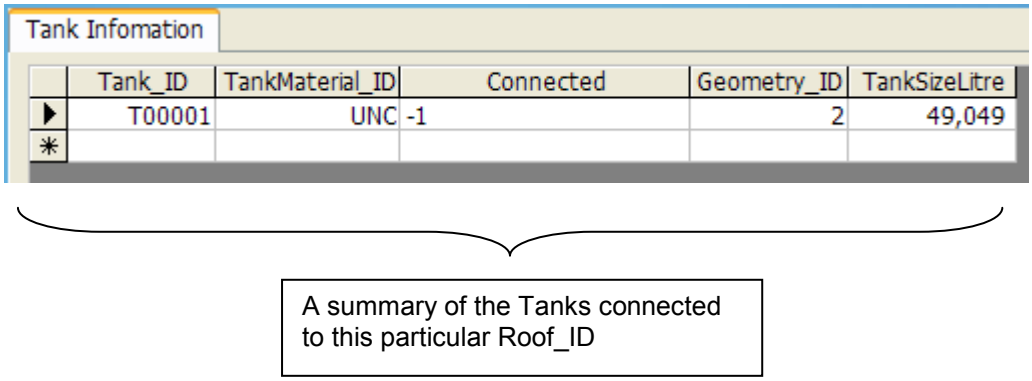
Roof Form - Quick Overview



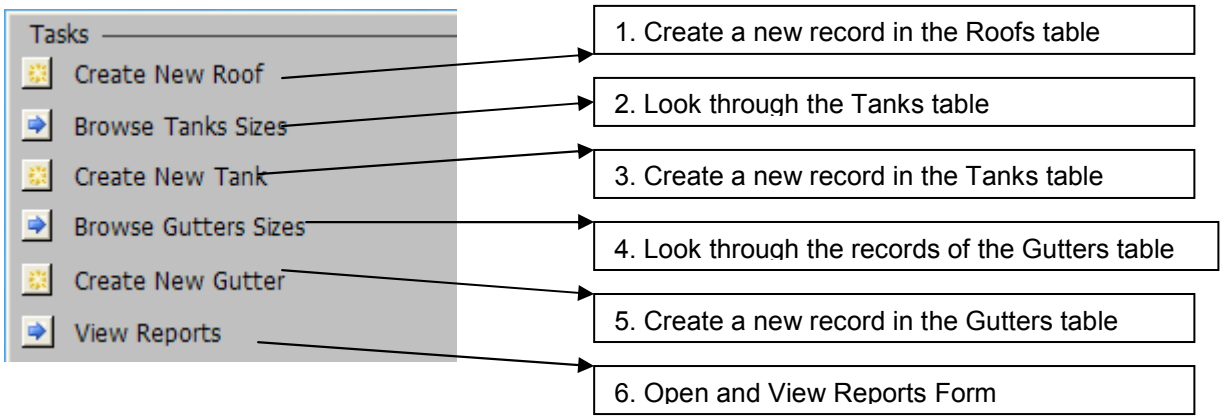
The Roof Details



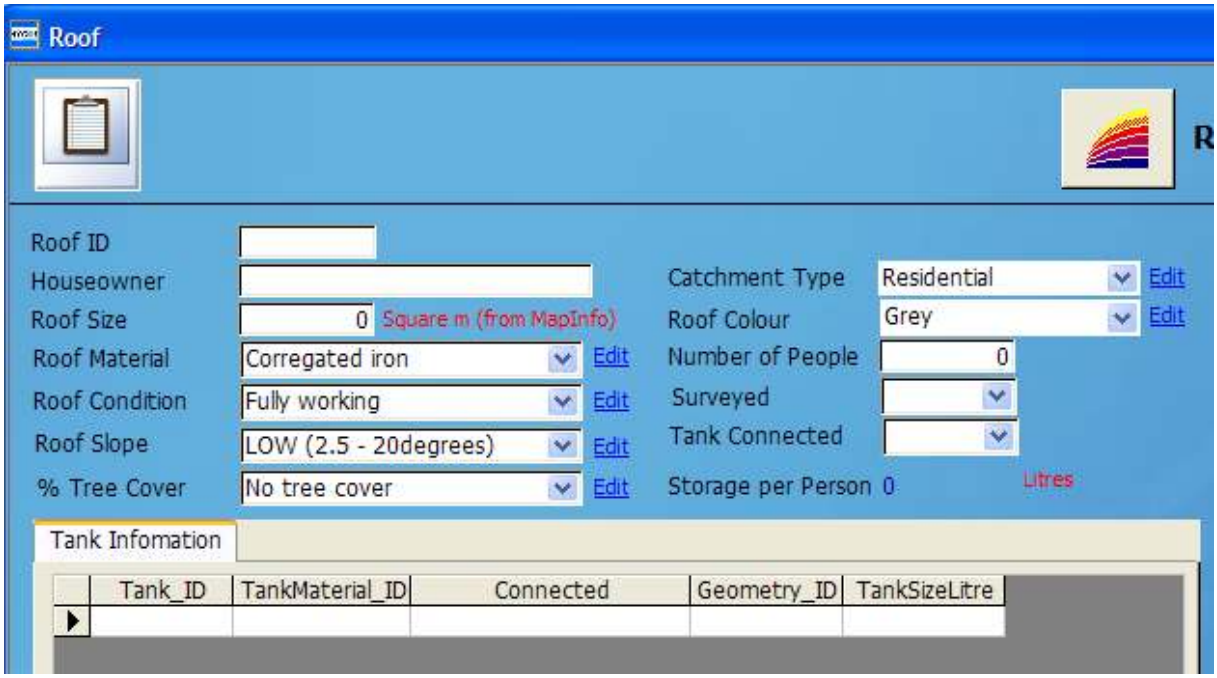
The Tanks Information



The Tasks Panel

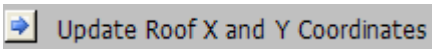

Tasks
Create New Roof
Browse Tanks Sizes
Create New Tank
Browse Gutters Sizes
Create New Gutter
View Reports
1. Create a new record in the Roofs table
2. Look through the Tanks table
3. Create a new record in the Tanks table
4. Look through the records of the Gutters table
5. Create a new record in the Gutters table
6. Open and View Reports Form

1. Create New Roof Create New Roof



Once the Create New Roof button in clicked, you will notice that the Roof_ID will be blank, indicating that this will be a new roof record:

Steps:

1. Input a new Roof_ID, can find out the last Roof_ID by clicking e.g.
2. Input House Owner
3. Ignore the Roof Size, it will be generated automatically by 

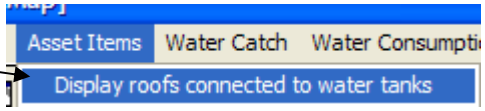
4. Select Roof Material
5. Select Roof Condition
6. Select Roof Slope
7. Select % Tree Cover
8. Select Catchment Type
9. Select Roof Colour
10. Input the number of People
11. Select Surveyed
12. Select number of tanks connected
13. Ignore Storage per Person, it will be generated automatically by

NB: Remember that you will have to manually digitize onscreen a new Roof in MapInfo with the same ROOF_ID

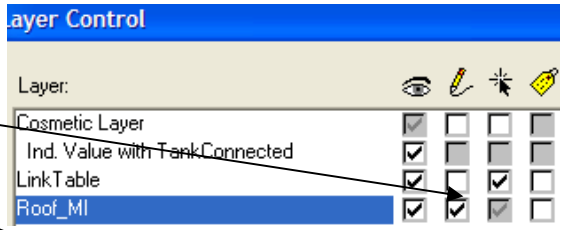
Steps:

1. Click the

button to launch MapInfo
2. Run Asset Items - > Display Roofs connected

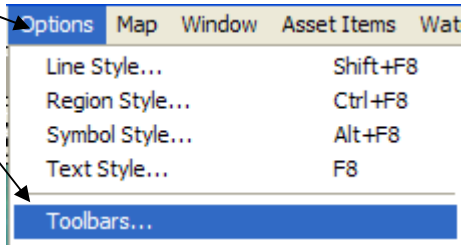


3. Make Layer Roof_MI editable in Layer Control



4. Check the pencil check box
5. Click

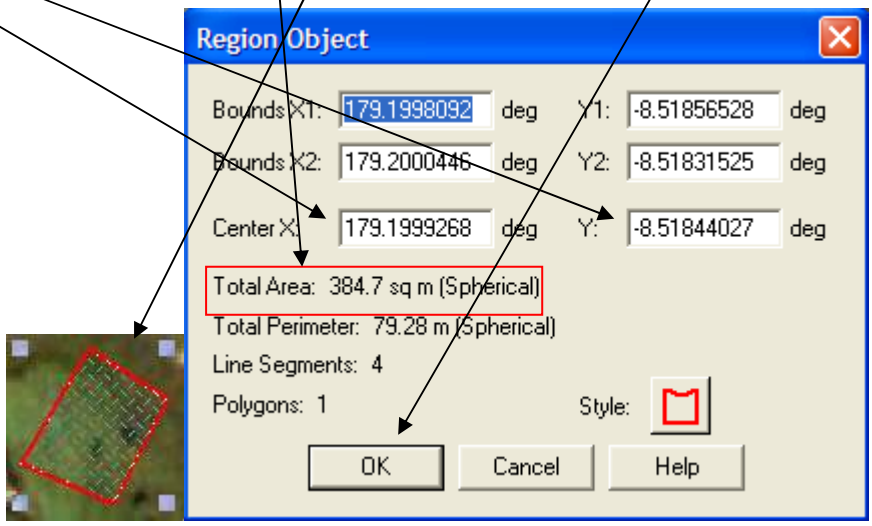
6. If the Drawing Toolbar is not loaded, click Options > Toolbars



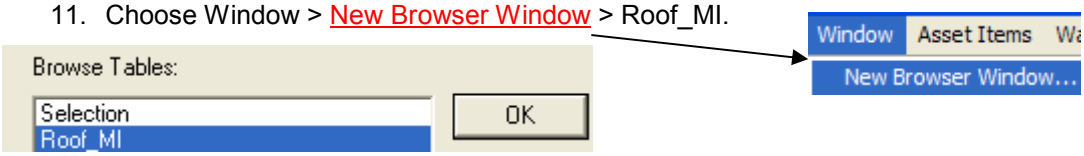
7. Check Load and Float check-boxes

8. Now, Select the Region Style and click OK
9. Select the region digitizing polygon and start on screen digitizing on top of the image backdrop.

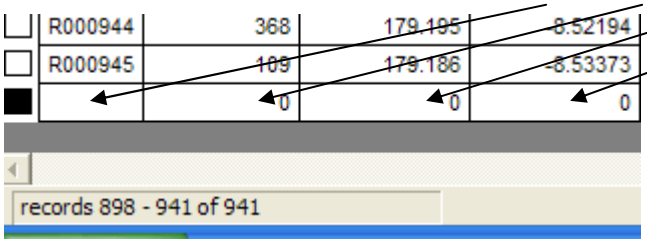
10. When you're done digitizing, double click on the roof polygon you've just digitised to get the X and Y coordinates and the area in square meters, the click OK



11. Choose Window > New Browser Window > Roof_MI.



12. Then go to the last record and update Roof_ID, Area then X and Y Coordinates.



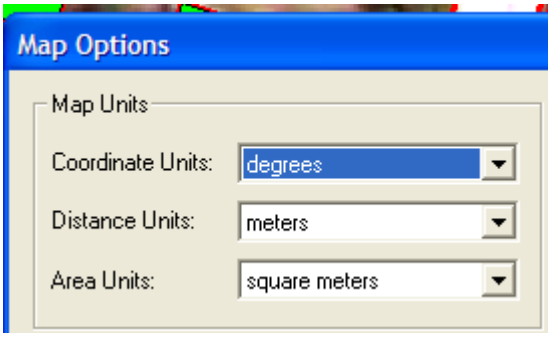
Roof_ID = R000946

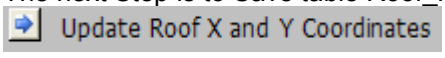
Area = 385

X = 179.1999

Y = -8.51844

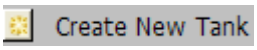
NB: Make sure the Map > Options is:

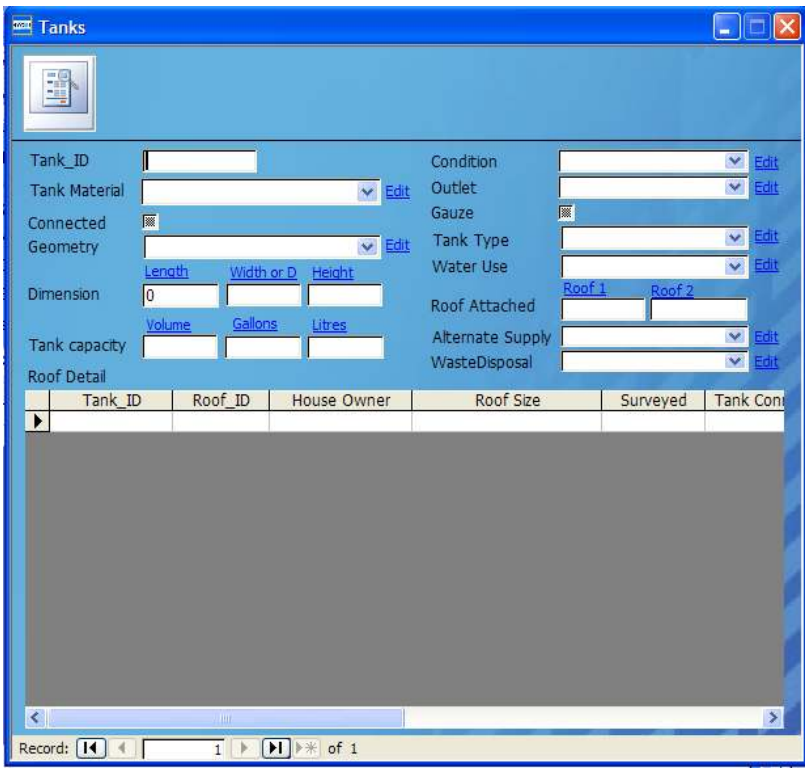


13. The next Step is to Save table Roof_MI, then goto Access and click on 

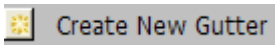
to update the ROOF_Main table in access.

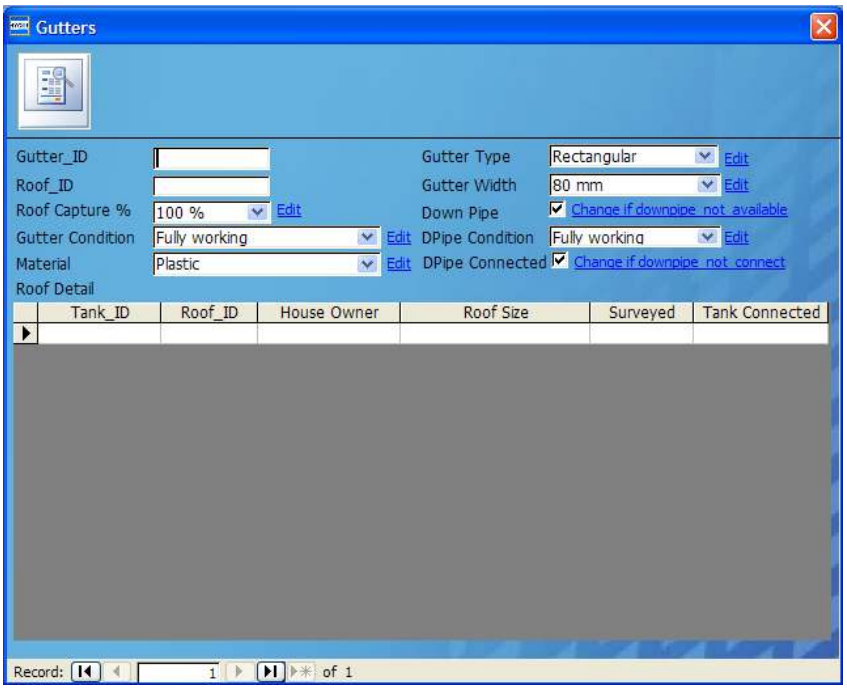
14. Finish

2. Create New Tank 



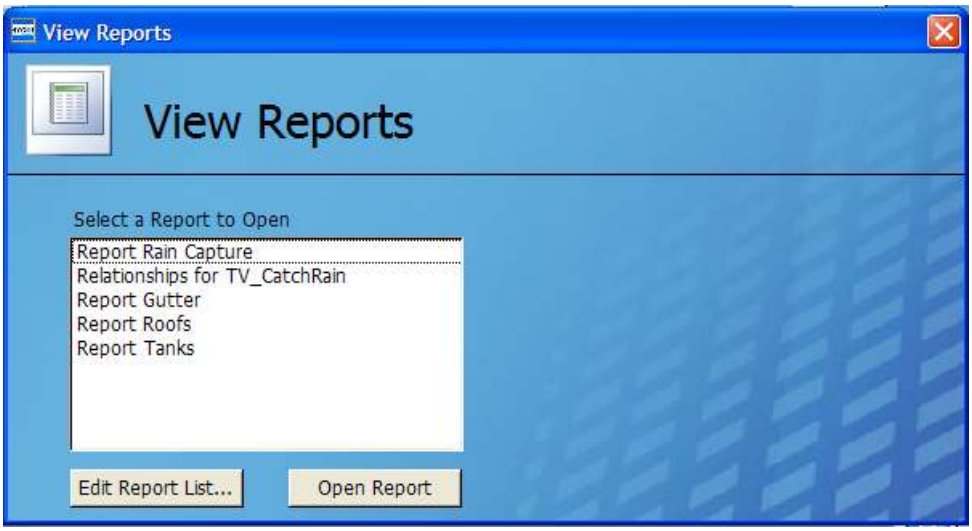
NB: The Create new Tank is pretty straight forward and you don't have to do any digitising in MapInfo, once you know how to add a new roof in access, it's the same procedure, but remember, to get the last ID, you have to got to the last record.

3. Create New Gutter 



NB: The Create new Gutter is pretty straight forward and you don't have to do any digitising in MapInfo, once you know how to add a new roof in access, it's the same procedure, but remember, to get the last ID, you have to got to the last record.

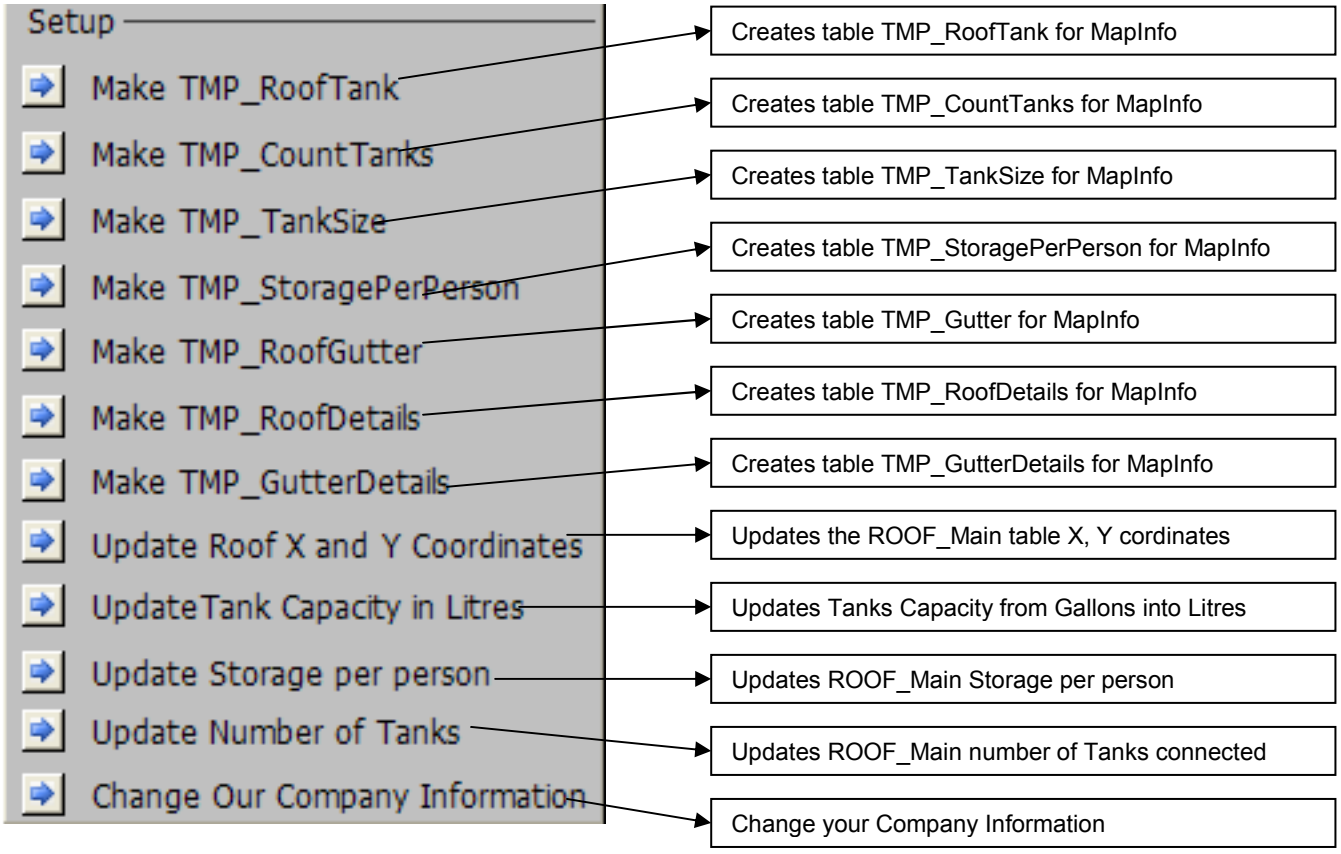
4. View Reports View Reports



NB: The View Reports pretty straight forward, all you need to do is just select the report then click Open Report to view report, or click Edit Report List... to edit the report list.

The Setup Panel

The Setup panel allows to user to run Make Table and Update Queries designed and hidden in the database window.

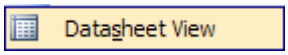

Setup
Make TMP_RoofTank
Make TMP_CountTanks
Make TMP_TankSize
Make TMP_StoragePerPerson
Make TMP_RoofGutter
Make TMP_RoofDetails
Make TMP_GutterDetails
Update Roof X and Y Coordinates
UpdateTank Capacity in Litres
Update Storage per person
Update Number of Tanks
Change Our Company Information
Creates table TMP_RoofTank for MapInfo
Creates table TMP_CountTanks for MapInfo
Creates table TMP_TankSize for MapInfo
Creates table TMP_StoragePerPerson for MapInfo
Creates table TMP_Gutter for MapInfo
Creates table TMP_RoofDetails for MapInfo
Creates table TMP_GutterDetails for MapInfo
Updates the ROOF_Main table X, Y cordinates
Updates Tanks Capacity from Gallons into Litres
Updates ROOF_Main Storage per person
Updates ROOF_Main number of Tanks connected
Change your Company Information

NB: It is important to run these Setup Queries whenever there have been changes to your ROOF, TANKS and GUTTERS tables.

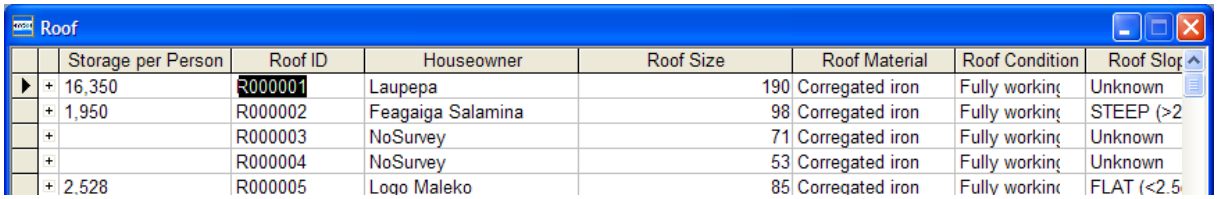
To Edit any Existing Record

To edit any of the existing records, whether its Roofs, Tanks or Gutters, just simply open the form:

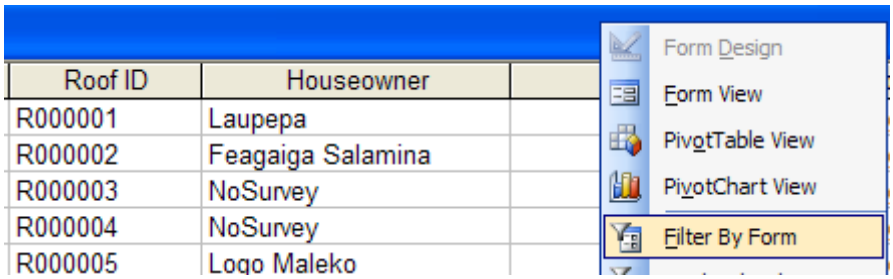
Steps:

1. Right-Mouse-Click on any of the forms and select 

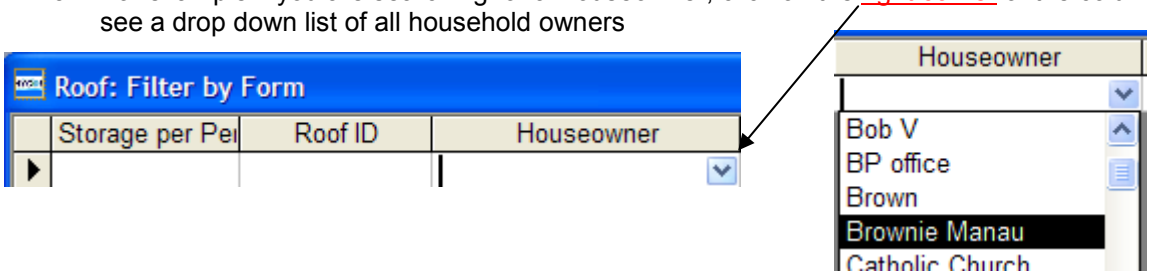
Datasheet View of the Roof's Table



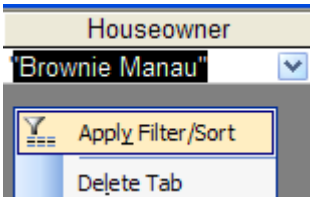
2. Right-Mouse-Click on the Datasheet View and Select



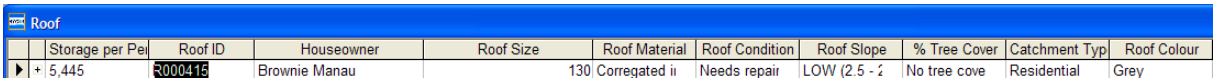
3. For example if you are searching for a Houseowner, click on the right corner of the column to see a drop down list of all household owners



4. Select the Houseowner, then Right-Mouse-Click and Select



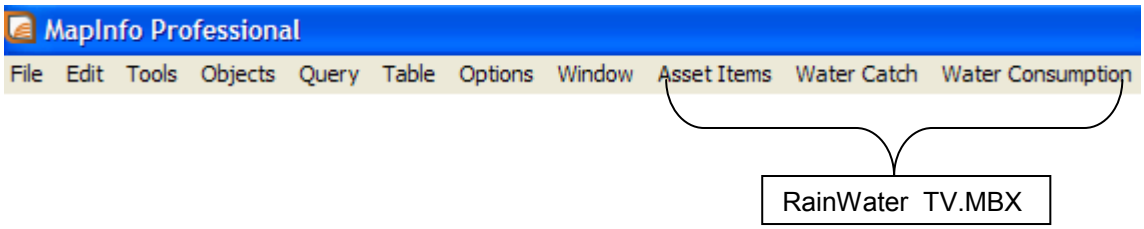
5. Edit



MapBasic Application and MapInfo

The MapBasic Application can be launched from inside TV_CatchRain DB

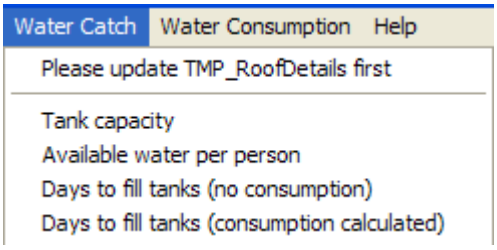
or can be found in C:\TVCRDatabase\MB_Programs as RainWater_TV.MBX


MapInfo Professional
File Edit Tools Objects Query Table Options Window Asset Items Water Catch Water Consumption
RainWater TV.MBX

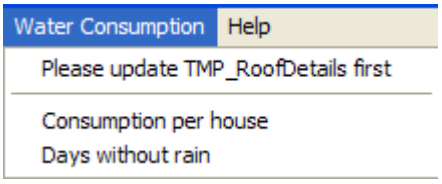
The RainWater_TV.MBX application adds another 3 extra menu items to the MapInfo Main Menu:

1. Asset Items

2. Water Catch



3. Water Consumption



The 3 extra menu items pretty much speaks for themselves, all you need to do is follow instructions then give them a click and see what they produce.